CROSS CONNECTION CONTROL (CCC)

Presented by:
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Presentation Overview

- **Causes of Backflow**
- **Different Types of Cross-Connections**
- **Backflow Incidents**
  - Real life examples
  - Costs associated with backflow incidents
- **Selecting the Proper Backflow Prevention Device**
- **Louisiana Cross-Connection Regulations**
  - Water system responsibilities
  - Home /Business Owner responsibilities
  - Installation, testing, & repair requirements

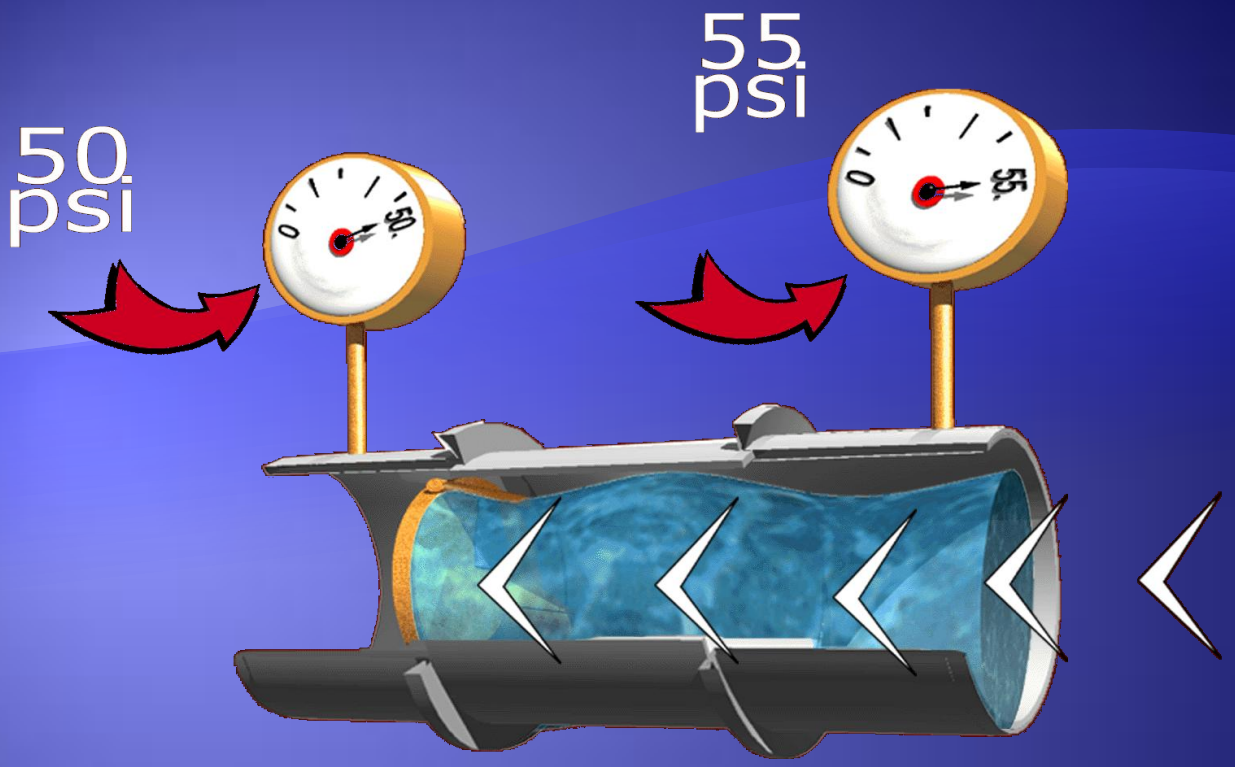
Backflow

Backflow: The flow of water or other liquids, mixtures, or substances into the distribution pipes of a potable water supply from any source other than its intended source.

- **Two Causes of Backflow**:
  - Back Pressure
  - Back Siphonage

Backpressure

Pressure in Downstream Piping Greater than Supply Pressure

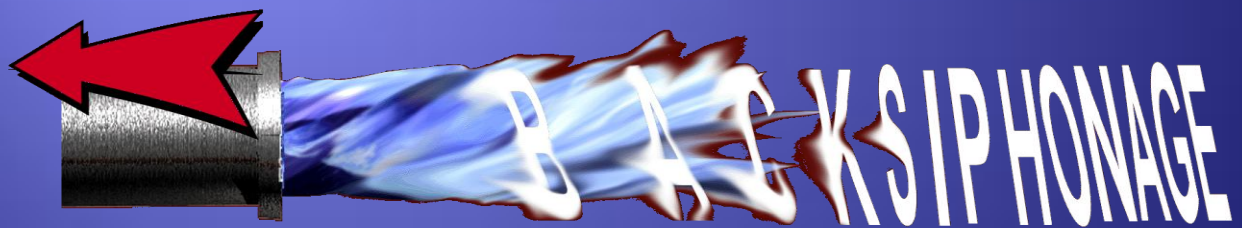


Backpressure

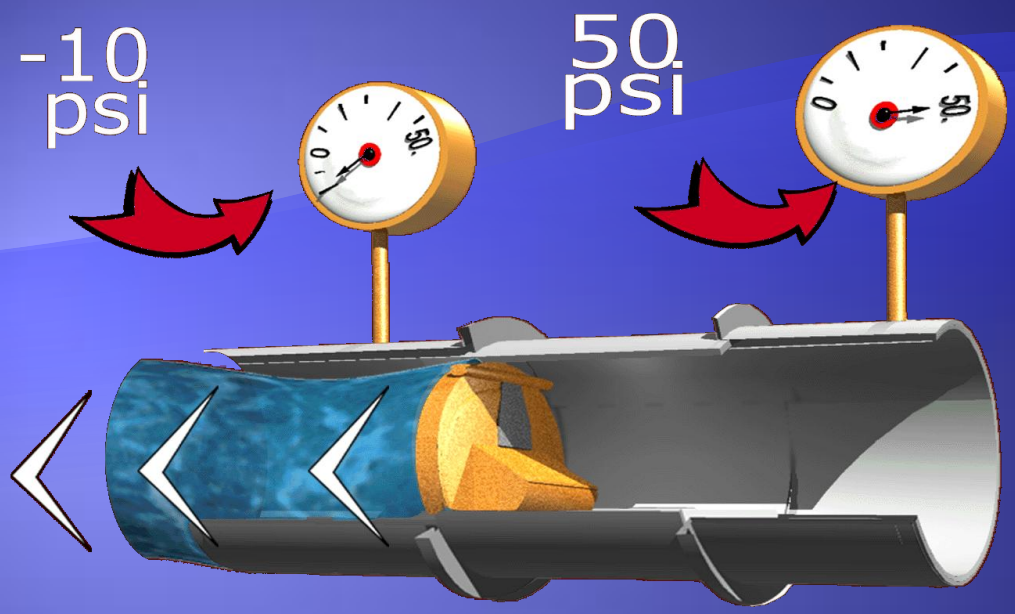
Potential causes of backpressure include heating/cooling systems, pumping equipment, and elevated storage tanks

Backsiphonage

Sub-Atmospheric Pressure in the Water System



Normal Direction of Flow



Backsiphonage

Potential causes of backsiphonage include water main breaks, flushing, pump failure, and emergency firefighting.

What's the big deal with reversed flow anyway???

http://blog.bioethics.net/2008/10/

Cross Connection

Cross Connection: Any actual or potential connection between a potable water supply with a source of pollution, contamination, or other non-potable substance that could change the quality of water in a potable water supply.

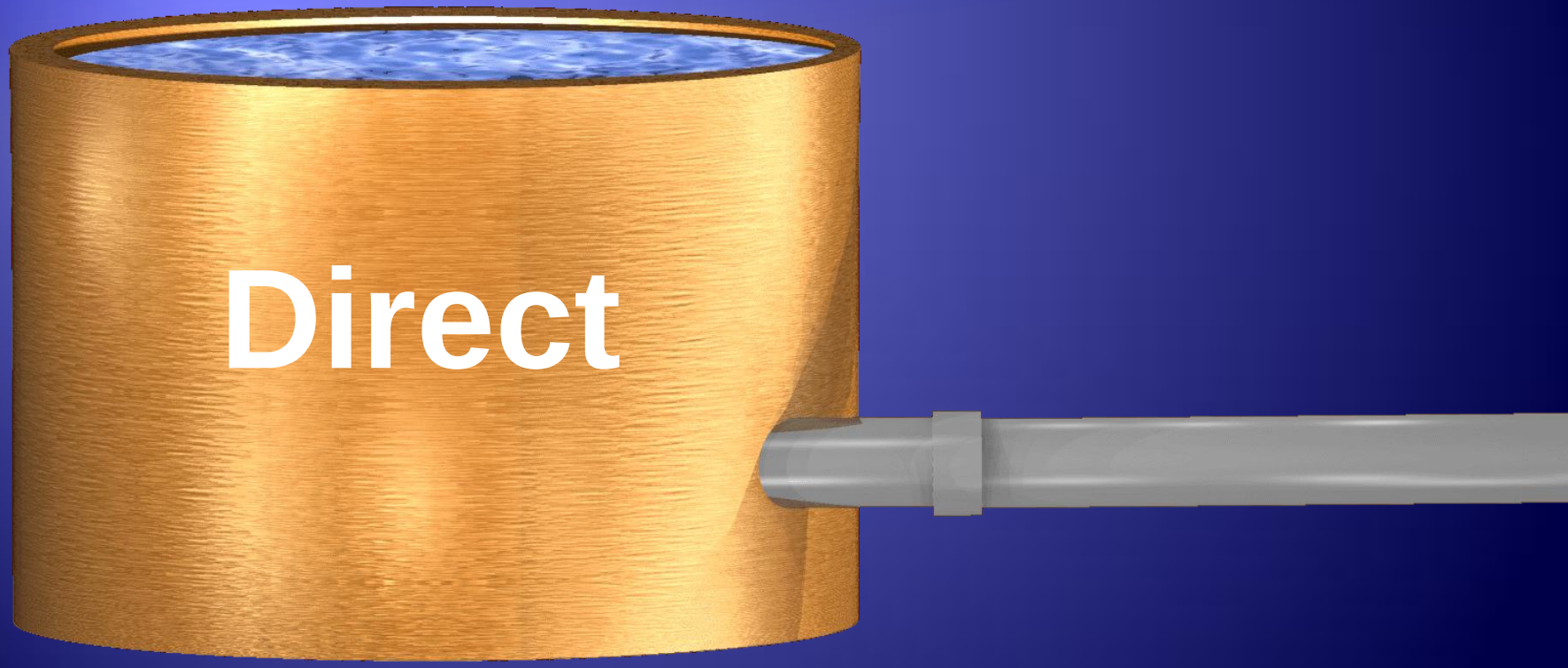
- **Direct Connection**- subject to back pressure.
- **Indirect Connection**- is not subject to back pressure.

Submerged Inlet

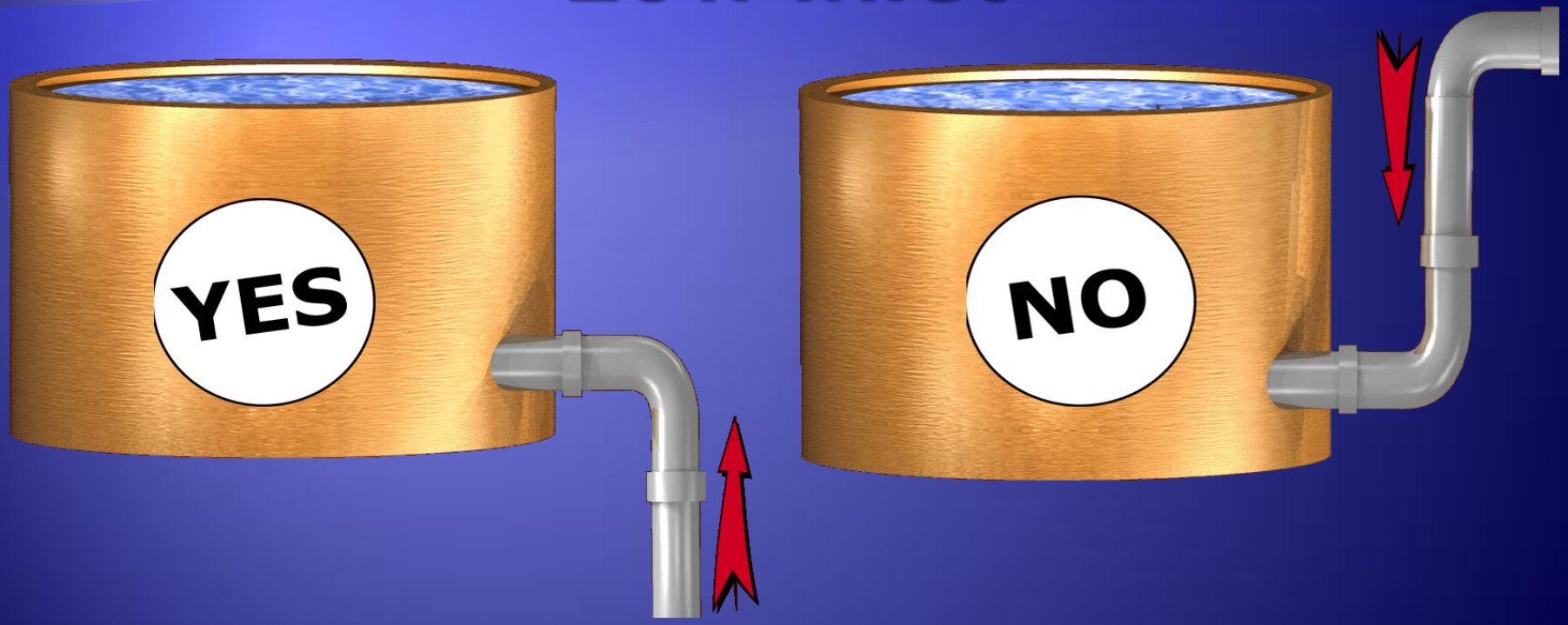
Direct or Indirect Connection???

Low Inlet

Direct or Indirect Connection???



Low Inlet

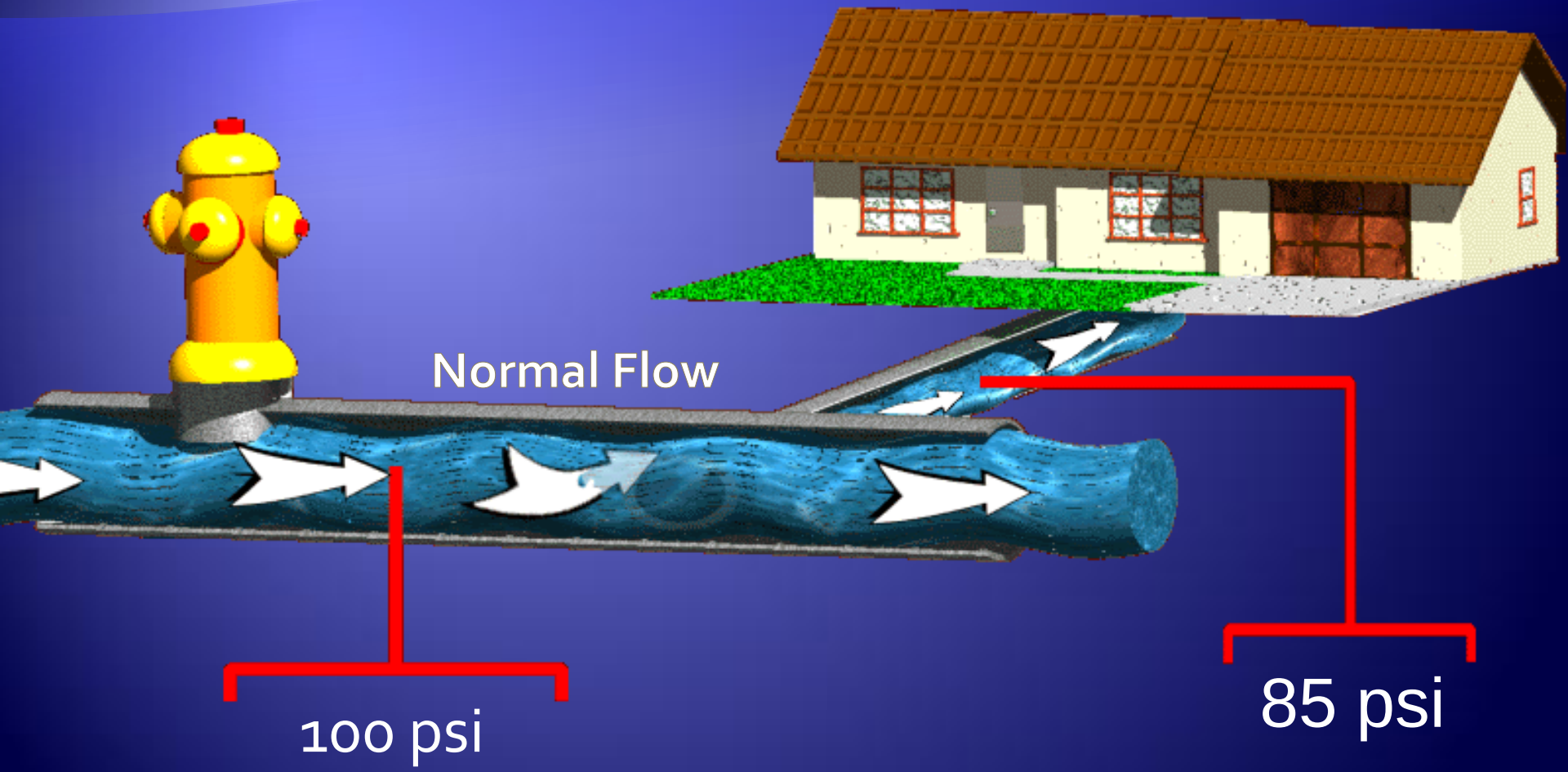


Direct Cross-Connection?

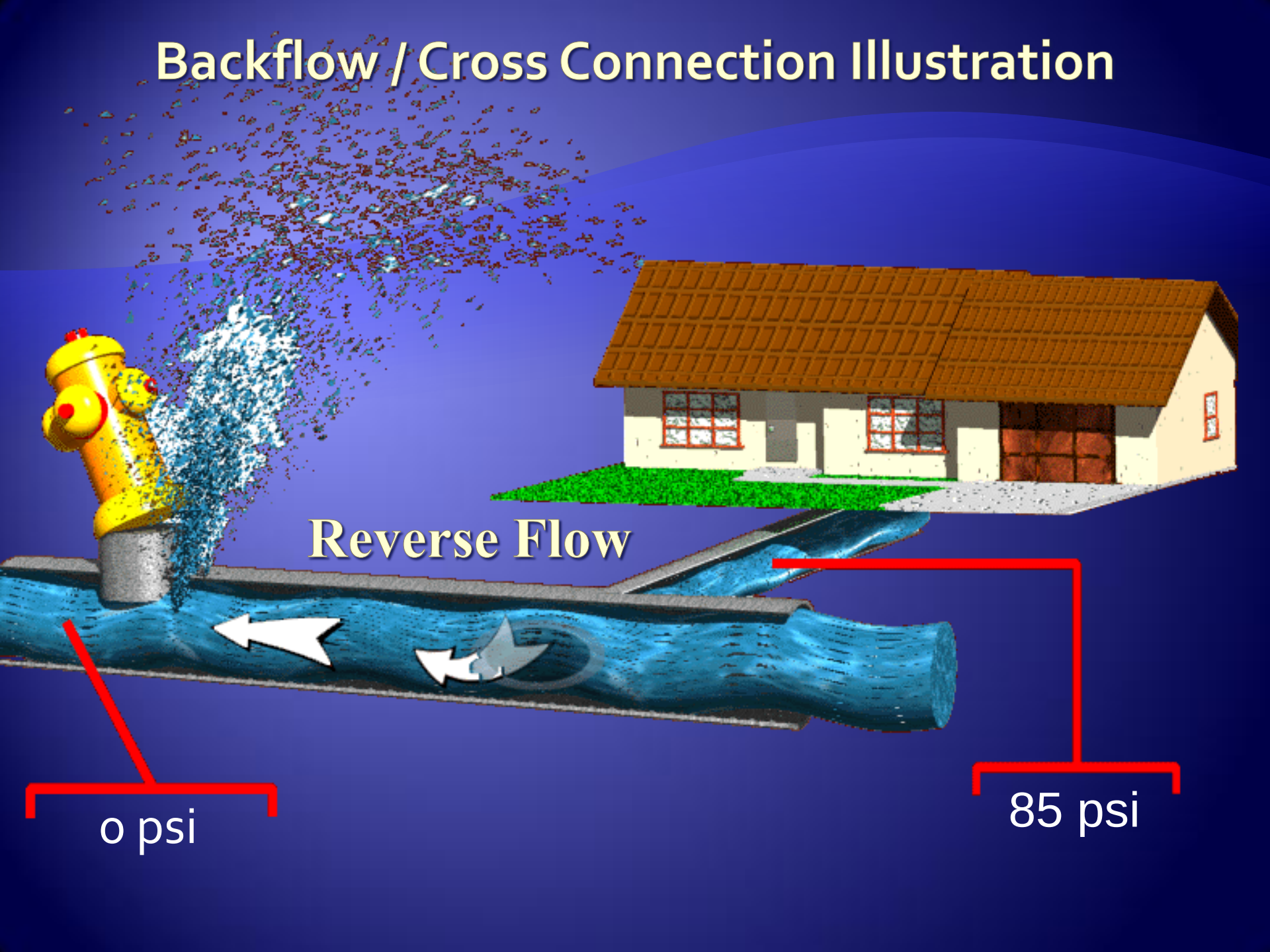
Cross-Connections

- Common Examples:
  - Hose Bibs
  - Irrigation Systems
  - Auxiliary Water Systems
  - Processing Tanks
  - Swimming Pools
  - Fire Suppression Systems
  - Photo Developing Equipment
  - Laboratory and Aspirator Equipment
  - Fire Sprinkler Systems
  - Boilers

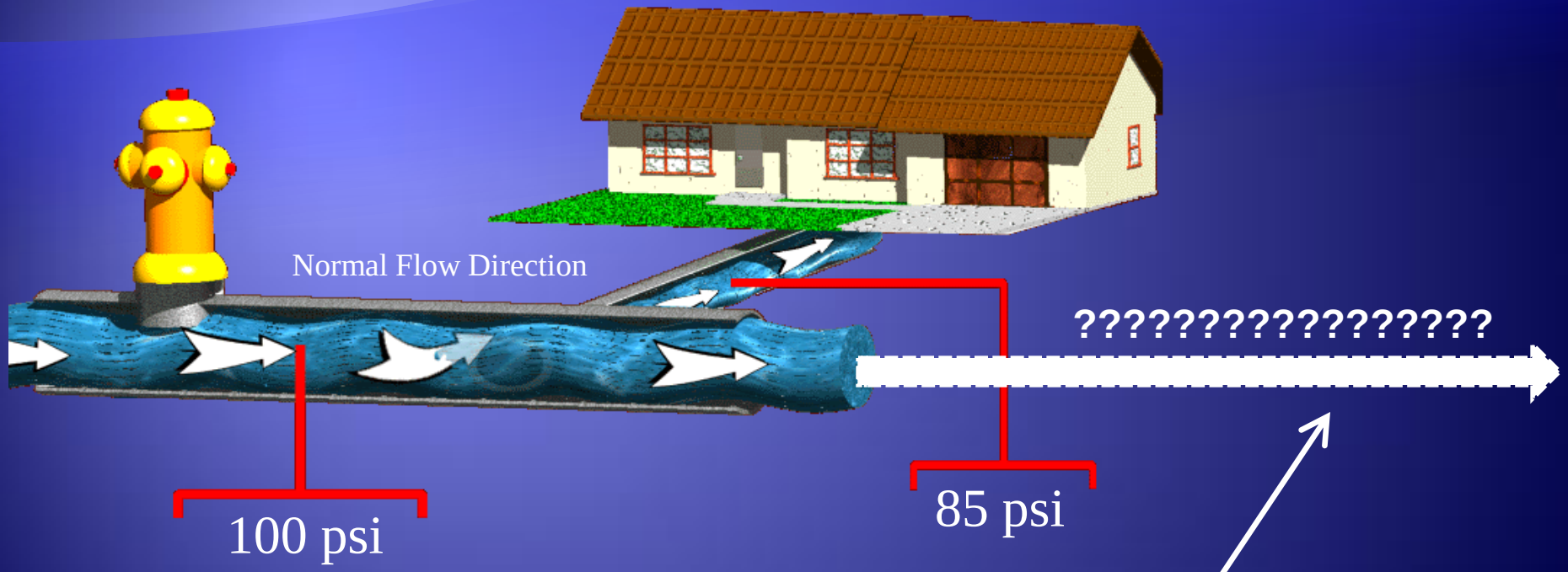
Backflow / Cross Connection Illustration



Backflow / Cross Connection Illustration

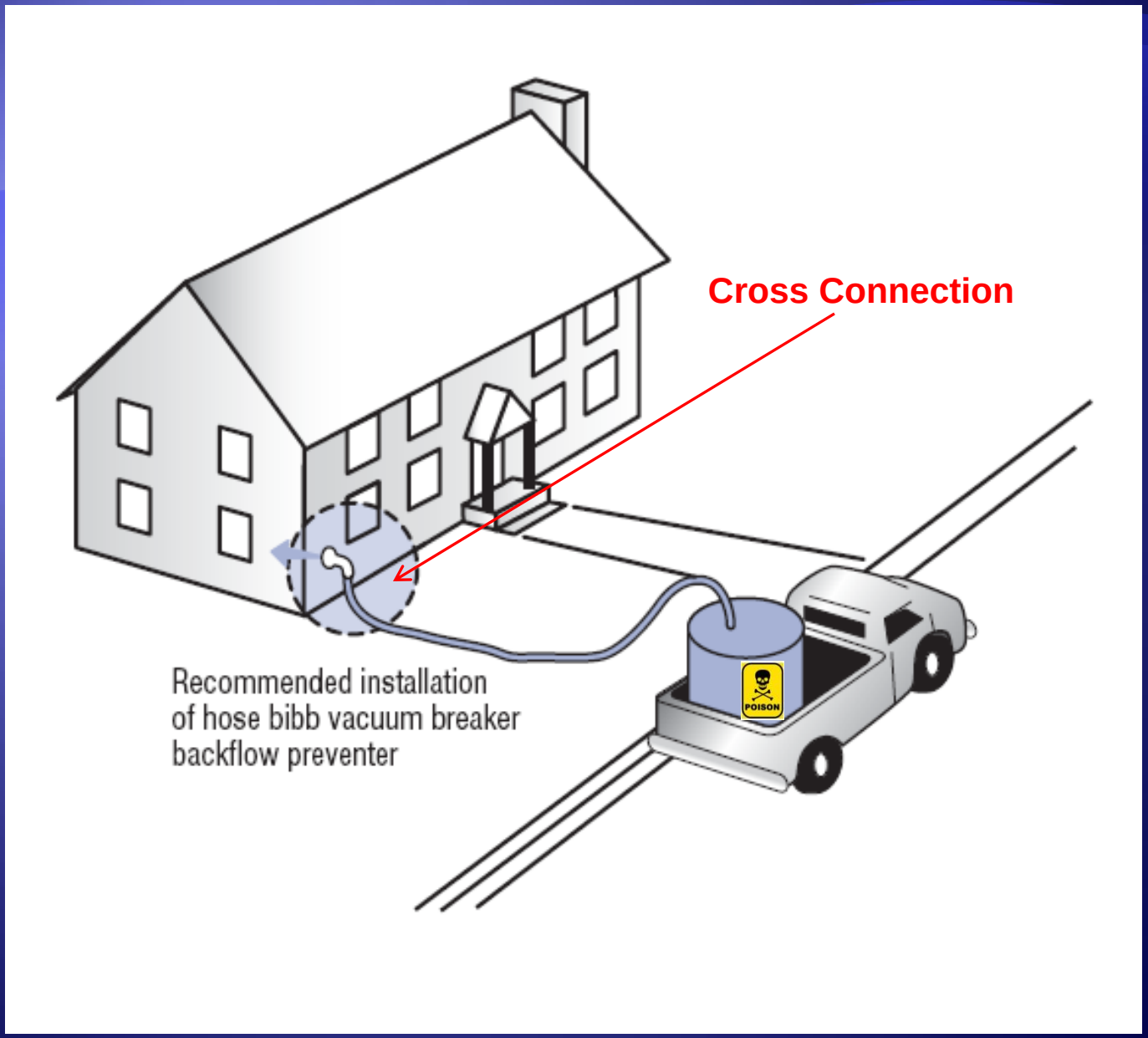


Backflow / Cross Connection Illustration

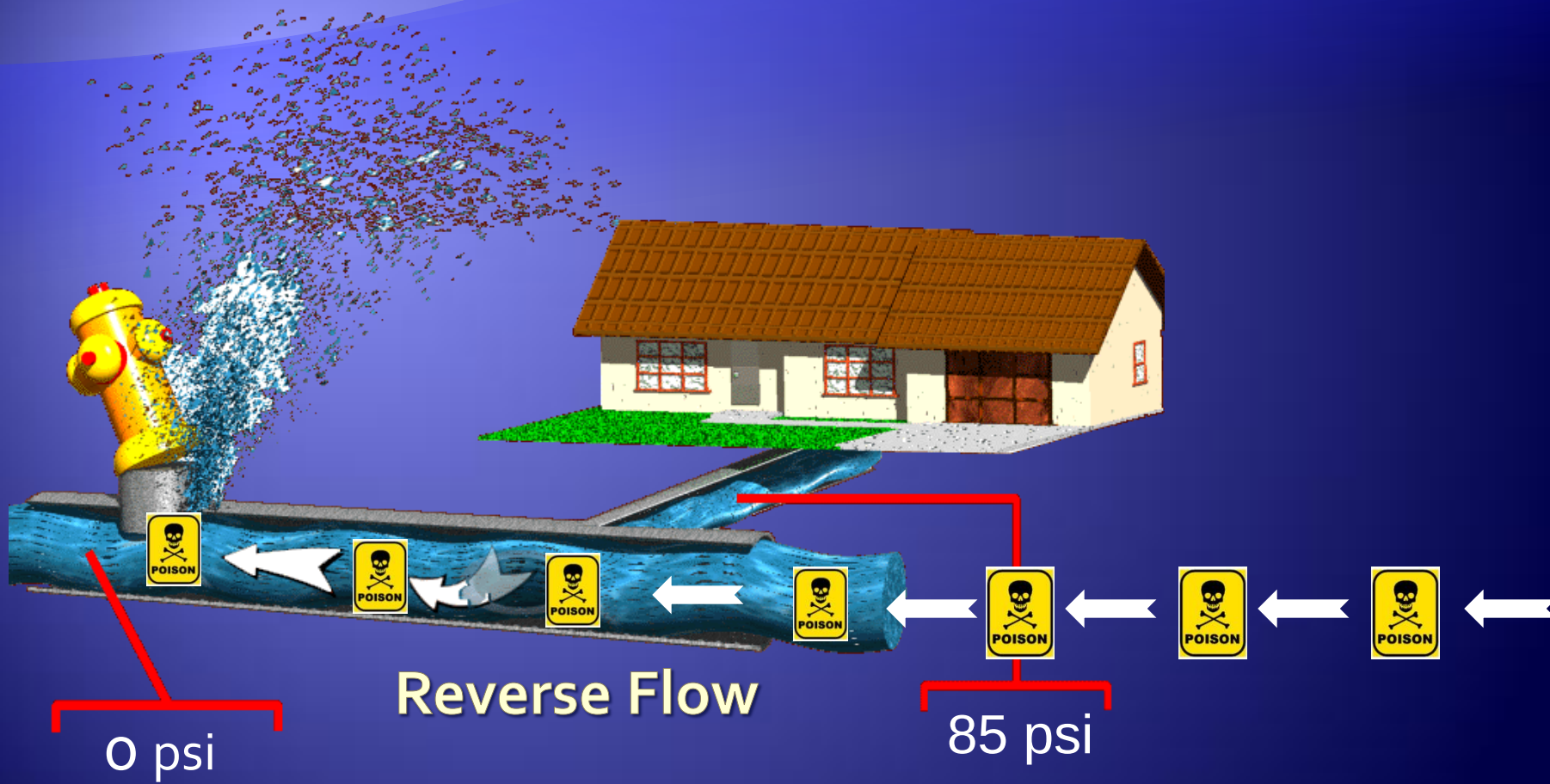


What was going on downstream at the time of the backflow incident???

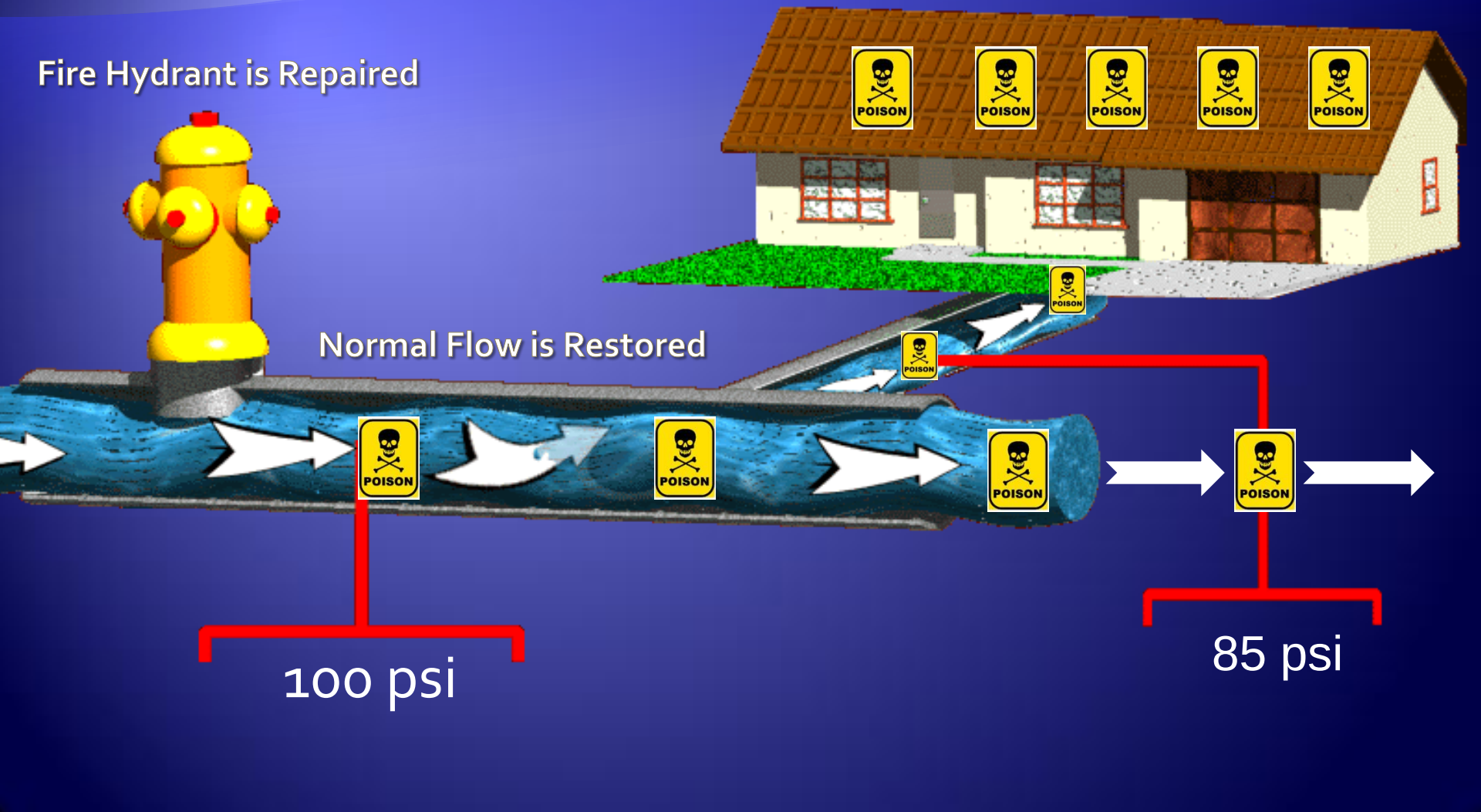
Backflow / Cross Connection Illustration



Backflow / Cross Connection Illustration



Backflow / Cross Connection Illustration



Documented Backflow Incidents

- The U.S. Environmental Protection Agency (EPA), Office of Ground Water and Drinking Water - Standards and Risk Management Division has compiled backflow incident data which is summarized in the technical paper titled, *Potential Contamination Due to Cross Connections and Backflow and the Associated Health Risks – Sept. 27th, 2001.*

- The compilation of backflow incident data found that **459** incidents resulted in an estimated **12,093** illnesses from 1970 to 2001.

Residential Sites		
Source of Contamination	**Documented Incidents**	**Examples of Incidents**
Homes With Individual Connections	**55**	• In 1991, an atmospheric vacuum breaker valve intended to protect a cross-connection between an irrigation system and the potable supply malfunctioned, allowing backflow of irrigation water into the public water system. The water system, located in Michigan, was contaminated with nematodes, rust, and debris (AWWA PNW S, 1995). • In 1997, recycled water reached approximately 1,600 California homes and businesses from a residential connection after a property owner illegally tapped into a reclaimed water line (California HHS Agency, 2001).
Apartment Buildings or Condominiums	**27**	• In 1981, chlordane and heptachlor were backsiphoned through a garden hose submerged in a termite exterminator's tank truck in Pennsylvania. An undisclosed number of illnesses occurred, and 75 apartment units were affected (NAPHC C, 1996). • In 1985, hexavalent chromium backflowed from a Boston, Massachusetts condominium's cooling tower into the potable water system (NAP HCC, 1996).
Mobile Homes or Mobile Home Parks	**1**	• In 1984, a leak developed in a wall of a solar water heating system which allowed dichlorofluoromethane into the residential water supply of a mobile home in Oregon (AWWA PNW S, 1995).
Neighborhood	**3**	• In 1995, a business tapped into an irrigation line containing untreated water in Yakima, Washington, without installing a backflow prevention device. This allowed *Giardia* to contaminate area residences, resulting in 11 cases of giardiasis. (AWWA PNW S, 1995). • In 1997, a fire truck pump created backpressure on a fire hydrant before the valve was closed, forcing over 60 gallons of aqueous fire-fighting foam into an estimated 40,0 00 neighborhood taps in Charlotte-Mecklenburg, North Carolina (ABPA, 1999).

EPA, *Potential Contamination Due to Cross Connections and Backflow and the Associated Health Risks – Sept. 27th, 2001*

Government and Institutional Sites		
Source of Contamination	**Documented Incidents**	**Examples of Incidents**
Medical Sites (Hospital, Dental, Nursing Sites, Blood Bank s, etc.)	**27**	• In 1982 in Illinois, ethylene glycol back siphoned from an air conditioning system's water holding tank into a group of dialysis machines, contributing to the death of "several" (number not given) patients (AWWA PNW S, 1995). • During shut-down of a water main to repair a valve in 1984, the backflow of water from a nursing home's boiler caused burns to a water department employee's hands in Washington State (AWWA PNWS, 1995).
Schools, Universities, and Children's Camps	**31**	• In 1990, six staff members of an Indiana middle school reported becoming ill after drinking water containing ethylene glycol that back flowed from the school's cooling system into the potable water system (AWWA PNW S, 1995). • In 1987, copper sediment contamination in a beverage mixing tank resulted in four cases of illness in a residence hall at Michigan university (AWW A PNW S, 1995). • In 1995, three people became ill at a California school after drinking water from a system with a double-check backflow prevention valve that did not meet industry standards and had badly deteriorated rubber gaskets (Craun and Calderon, 2001).
Public Water Systems	**15**	• In 1984, creosote was backsiphoned through a three-quarter inch hose used to prime a pump, contaminating a section of a Georgia community water system. No illnesses were reported (AWWA PNW S, 1995). • In 1970 in Mattoon, Illinois, hot wash water from an asphalt plant back pressured into mains during flow testing of fire hydrants (USC FCCCHR, 1993).
Other Government/ Institutional Sites (e.g., public buildings, churches)	**24**	• In 1976, water fountains at the State Capitol building in Salem, Oregon, were contaminated with freon gas from a ruptured heat exchanger. The gas combined with the fluoride in the water supply, forming an acid compound that caused a bitter, burning taste (AWWA PNW S, 1995). • In 1994, the water system at a Tennessee prison was cross-contaminated by the facility's wastewater pump station, resulting in 304 cases of giardia (Craun and Calderon, 2001). • Purified drinking water lines at the Oak Ridge Reservation's K-25 atomic bomb fuel plant were interconnected for an unknown length of time (possibly on the order of decades) with lines carrying impure creek water. The creek water contained poisons generated from nuclear fuel production, possibly including contaminant s such as strontium -90 and arsenic (Nashville Tennessean, 2000).

EPA, *Potential Contamination Due to Cross Connections and Backflow and the Associated Health Risks – Sept. 27th, 2001*

Commercial Sites		
Source of Contamination	**Documented Incidents**	**Examples of Incidents**
Restaurants	**28**	• In 1979, two high school students in Seattle, W A, became ill, showing symptoms of copper poisoning after drinking soft drinks from a dispensing machine in a restaurant. The backflow of carbon dioxide from the soft drink dispensing machine was considered the likely cause of the copper release (AWWA PNWS, 1995). • In 1987, a child in Minnesota suffered acute copper toxicity when backflow from a carbon dioxide machine contaminated a restaurant's potable system (AWWA PNW S, 1995).
Office Buildings	**18**	• In 1989, a backflow event at an Ohio government office building occurred after crews worked on the air conditioning system. Twelve individuals became ill after ingesting water that had been contaminated with Acid Blue 9, an algae-retarding chemical (AWWA PNW S, 1995). • In 1991, trichloroethane entered the distribution system of a city in Missouri from a newspaper office. Uncoordinated flushing by the water system caused the contaminant to spread throughout the system, with concentrations as high as 420 micrograms/L (AWWA PNWS, 1995).
Other Commercial Sites	**66**	• In 1974, backsiphonage of a chromium compound from the chiller water of an air conditioning system contaminated the drinking water system in the auditorium hosting the 94th annual AWWA conference and exhibition in Massachusetts, involving thousands of people (AWWA PNWS, 1995). • In 1994, a number of individuals attending an Ohio convention got sick with giardiasis, spread by an ice machine contaminated by a cross-connection to a sewage drain (AWWA PNWS, 1995).

EPA, *Potential Contamination Due to Cross Connections and Backflow and the Associated Health Risks – Sept. 27th, 2001*

Miscellaneous Sites

Source of Contamination	Documented Incidents	Examples of Incidents
Agricultural Sites	**6**	• In 1991, an antibiotic solution used at a commercial chicken house entered an Arkansas public water system as a result of a cross-connection between an auxiliary well connected to the chicken house plumbing (AWWA PNW S, 1995). • In 1995, pesticides (paraquat and atrazine) were backsiphoned into a distribution system when an accidental water main cut occurred while a Louisiana farmer was diluting herbicides in a tank. Some people reported nausea, stomach burns and pains, profuse sweating, diarrhea, and shortness of breath. The incident was the subject of a class-action lawsuit (AWWA PNWS, 1995).
Recreational Sites	**10**	• In 1986 in Springfield, MO, failure of a single check valve on a soft drink dispensing machine at a local fair resulted in the backflow of carbon dioxide that created levels of 2.7 mg/L of copper and 2.2 mg/L of zinc. Three people experienced vomiting and abdominal pain (AWWA PNWS, 1995). • In 2000, contaminated water lines at an Ohio fairground resulted in an outbreak of *E. coli* resulting in 30 cases of illness (Cleveland Plain Dealer, 2001).
Industrial Sites	**40**	• In 1989, backpressure from a propane tank car forced propane into the water supply of Fordyce, Arkansas. Three people in separate buildings were injured from explosions after flushing toilets, and two houses were destroyed and a business was damaged by explosions and subsequent fires (AWWA PNWS, 1995). • In 1990, at least two individuals became ill after an unknown quantity of industrial chemicals backflowed into the public water supply via an unprotected auxiliary line illegally tapped to a hose connected to the plant's flushing system. The incident occurred at a New Mexico facility that transforms wheat and barley into ethanol (AWWA PNWS, 1995).
Other Sites/Site Type Unknown	**108**	• In 1980, a cross-connection aboard an Alaskan crab processing ship resulted in backflow of sewage (including *Giardia*), causing 189 employees to become ill and endangering about $35 million worth of processed king crab (USC FCCCHR, 1993; CDC, 1982).

Costs Associated With Backflow Incidents

- Typical Costs of Backflow Incidents Include:
  - Public Notification
  - Responding to consumer complaints
  - Consumer Confidence Issues
  - Repairs to distribution system & property damage
  - Sampling & Laboratory Analysis
  - Purchase of bottled water
  - Law suits
  - Medical expenses
  - Illness
  - & Potential for Loss of Life!

Backflow Incident Prevention

- What can be done to prevent incidents???
  - Conduct regularly scheduled inspections of the distribution system to locate cross-connections.
  - Try to eliminate cross-connections when possible.
  - Promote public education to prevent cross-connections.
  - With the use of approved backflow prevention devices and assemblies.

Selection Of Proper Backflow Prevention Device

- Physical Characteristics of the Cross-Connection
  - Direct or Indirect Connection
  - Continuous or Non Continuous Use
- Degree of Hazard
  - Non-Health Hazards (Pollutants)
  - Health Hazards (Contaminants)
- ***Continuous Use*** – In use for 12 hours or more.

	Indirect Backsiphonage Only		Direct Backsiphonage & Backpressure
	Continous Use	Non-Continous Use	
Health Hazard	PVB/SVB RP Air Gap	AVB PVB/SVB RP Air Gap	RP Air Gap
Non-Health Hazard	PVB/SVB RP DC Air Gap	AVB PVB/SVB DC RP Air Gap	DC RP Air Gap

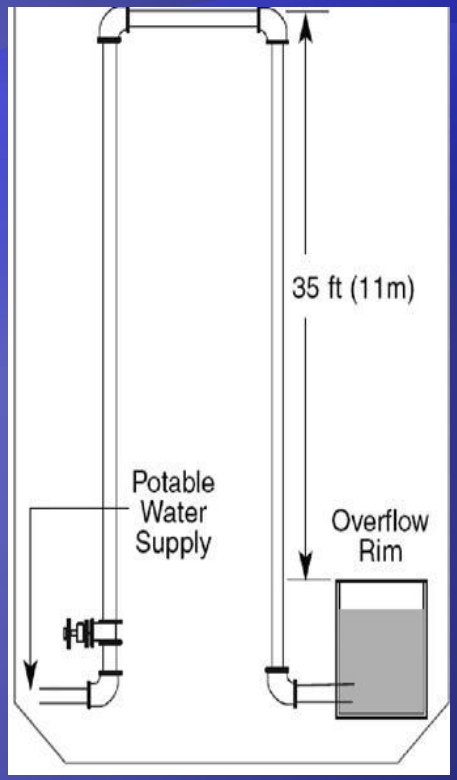
Backflow Prevention Devices and Methods

- Backflow Prevention Methods:
  - Air Gap Separation
  - Barometric Loop
- Backflow Prevention Devices
  - Reduced Pressure Principle Assembly (RP)
  - Double Check Valve Assembly (DC)
  - Pressure Vacuum Breaker (PVB)
  - Atmospheric Vacuum Breaker (AVB)

Air Gap

- Most effective method of backflow prevention.
- Used in health and non-health installations.
- Protects against back pressure and backsiphonage.

Barometric Loop



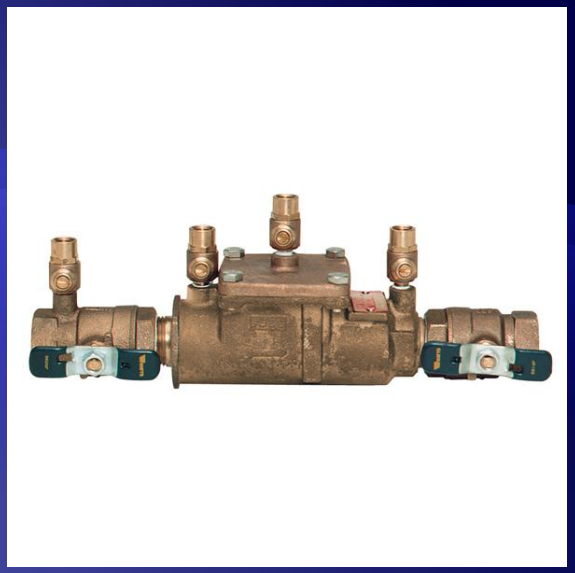
- Based on the principle that a column of water won't raise above 33.9 feet at sea-level atmospheric pressure.
- Used in health and non-health installations.
- Protects against backsiphonage only.

Atmospheric Vacuum Breakers (AVB)

- Used in health and non-health hazard installations.
- Protects against backsiphonage ONLY.
- Should NOT be used under constant pressure.
- Commonly used on plumbing fixtures and hose bibs.

Pressure Vacuum Breaker (PVB)

- Used in health and non-health hazard installations.
- Protects against backsiphonage ONLY.
- Can be used under constant pressure.
- Commonly used in agricultural and irrigation installations.



Double Check Valve Assembly (DC)

- Used in non-health hazard installations.
- Protects against backsiphonage and backpressure.
- Can be used under constant pressure.
- Common installations include fire sprinkler systems, multiple residential dwelling units served by the same meter, multistoried office or commercial buildings.

Reduced Pressure (RP) Backflow Preventer

- Used in health and non-health hazard installations.
- Provides maximum protection against backsiphonage and back pressure.
- Can be used under constant pressure.
- Common installations include carwashes, dry cleaners, funeral parlors, hospital autopsy rooms, industrial processing plants, sewage facilities, etc.

Louisiana Cross-Connection Regulations

- Contained in the Louisiana Administrative Code, Title 51, Public Health Sanitary Code:
  - Part XII, Titled *Water Supplies*
  - Part XIV, Titled *Plumbing*; Also referred to as The LA State Plumbing Code, 2000 Edition (LSPC)

LSPC D108 Maintenance/Field Testing

Backflow Prevention Devices Which Require Field Testing:

- Double Check Valve Assemblies
- Reduced Pressure Principle Assemblies
- Pressure Type Assemblies
- Air gaps on high hazard applications
- As otherwise specified by the Plumbing Official (or water supplier when device is located on public property)

LSPC D108
Maintenance/Field Testing

Frequency of Field Testing:

- Upon installation
- When cleaned, repaired, or overhauled
- When relocated
- Annually &
- As required by the water system for backflow prevention devices under the complete control of the water supplier (e.g. water meter and piping upstream of the water meter)

LSPC D108
Tester Requirements

- Backflow Prevention Assembly Tester who meets ASSE 5000 Professional Qualification Standard, or
- An individual holding a testing certificate from a nationally recognized backflow organization.
- Licensed Plumbers with Water Supply Protection Specialist (WSPS) Endorsement
- Approved classes are listed on the State Plumbing Board's website at: http://www.spbla.com/uploads/APPROVED_WATER_SUPPLY_PROTECTION_PROGRAMS.pdf

LSPC D108
Installation and Repairer Requirements

- In private "Plumbing" systems:
  - A plumber licensed by the LA State Plumbing Board who also holds a special "water supply protection specialist" endorsement on his plumbing license.

- In Public Supply Systems:
  - Any devices located on their property can be installed and repaired by any individual found acceptable to the public water system.

LSPC D108
Owner Responsibilities

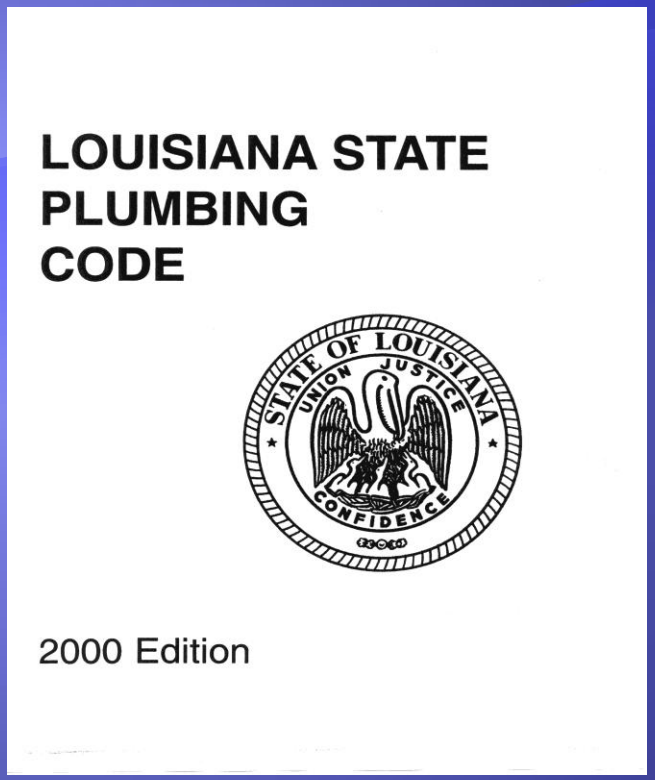
- Having the device tested in a timely manner
- Notify the Plumbing Official and/or water supplier in advance of testing
- Paying for testing, repairs, overhauls, or replacements
- Maintaining records of tests, etc., for at least 5 years and making such records available, upon request, to the Plumbing Official, water supplier, and/or the State Health Officer

LA Sanitary Code, Part XII Water Supplies

- **Section 343. Cross Connections**
  - There shall be no physical connection between a public water supply and any other water supply which is not of equal sanitary quality and under an equal degree of official supervision; and there shall be no connection or arrangement by which unsafe water may enter a public water supply system.

- **Section 345. Connection with Unsafe Water Sources Forbidden**
  - There shall be no cross-connection whereby water from a source that does not comply with State regulations may be discharged or drawn into any potable water supply which does comply with State requirements.

LA State Plumbing Code (LSPC)



- **Cross-connection regulations are contained in:**
  - Chapter 6, *Water Supply and Distribution*
  - Appendix D, *Cross Connection Control*

LSPC, Chapter 6
Water Supply & Distribution

- **Section 606.2 – Approval of Devices**
  - Devices for the prevention of backflow shall comply with the standards listed in **Table 606**. Devices installed in a potable water supply for protection against backflow shall be maintained in good working condition by the person having control of such devices.

Table 606
Backflow Prevention Devices

MATERIALS	STANDARDS
Air Gap Standards	ASME A112.1.2
Backflow Preventers, Double Check Valve Assembly	ASSE 1015, ANSI/AWWA C510
Backflow Preventers with Intermediate Atmospheric Vent	ANSI/ASSE 1012
Backflow Preventers, Double Check Detector Assembly	ANSI/ASSE 1048
Backflow Preventers, Hose Connection	ANSI/ASSE 1052
Backflow Preventers, Reduced Pressure Detector Assembly	ANSI/ASSE 1047
Backflow Preventers, Reduced Pressure Principle Assembly	ASSE 1013, ANSI/AWWA C511
Dual Check Valve Type Backflow Preventer	ASSE 1032, For carbonated beverage dispensers- post mix type
Field Test Procedures for Backflow Preventer Assemblies	ASSE 5010
Manual for the Selection, Installation, Maintenance and Field Testing of Backflow Prevention Devices	CAN/CSA-B64.10
Vacuum Breakers, Anti-Siphon, Pressure Type Assembly (Outdoor Use)	ASSE 1020
Vacuum Breakers-Atmospheric Pipe Applied	ANSI/ASSE 1001
Vacuum Breakers, Back Siphonage, Pressure Type Assembly (Spill Resistant)	ANSI/ASSE 1056
Vacuum Breakers, Hose Connection	ANSI/ASSE 1011
Vacuum Breakers, Laboratory Faucet	ANSI/ASSE 1035
Vacuum Breaker Wall Hydrants, Frost Resistant Automatic Draining	ASSE 1019
Water Closet Flush Tank Fill Valves (Ballcocks)	ASSE 1002

Louisiana State Plumbing Code, 2000 edition©

LSPC - Table D105, Fixture Isolation

- *Fixture Isolation* – a method of backflow prevention in which a backflow preventer is located at or near each potential source of pollution or contamination.
- Table D105 – Lists various Cross Connections and the Fixture Isolation Device required.
- NOTE: Table D104 is NOT inclusive of all potential contamination sources which may need containment protection.

Table D 105[1, 2]

Air Gap	
1.	Cooling Towers
2.	Chemical Tanks
3.	Commercial Dishwashers in commercial establishments
4.	Ornamental Fountains
5.	Swimming Pools, Spas, Hot Tubs
6.	Baptismal Fonts
7.	Animal Watering Troughs
8.	Agricultural Chemical Mixing Tanks
9.	Water Hauling Tanks
Reduced Pressure Principle Backflow Preventers	
1.	Commercial Boilers
2.	Air Conditioning, Chilled Water Systems
3.	Air Conditioning, Condenser Water Systems
4.	Pot-type Chemical Feeders
5.	Lawn Sprinklers with Fertilizer Injection
6.	Photo/X-ray/Film Processing Equipment
Double Check Valve Assembly	
1.	Food Processing Steam Kettles
2.	Individual Travel Trailer Sites
Atmospheric or Pressure Type Vacuum Breakers	
1.	Laboratory and/or Medical Aspirators
2.	Flushing Rim Bedpan Washers
3.	Garbage Can Washers
4.	Laboratory or Other Sinks with threaded or serrated nozzles
5.	Flushometer Operated Fixtures
6.	Commercial Washing Machines
7.	Lawn Sprinklers
8.	Hose Bibbs
9.	Commercial Dishwashers in commercial establishments

Notes:

1. See Tables G104.6 and G104.7 for fixture isolation practices in hospital plumbing systems.
2. Other Fixture Isolation Practices - Table D105 is not inclusive of all potential contamination sources which may need fixture isolation protection. For potential contamination sources not listed in this table, backflow prevention methods or devices shall be utilized as directed by the Plumbing Official.

LSPC, Appendix D
Cross Connection Control

- **Section D106. Responsibility of Water Suppliers**
  - Water suppliers shall be responsible to insure the protection of the water supply system from potential contamination from certain of their customers through *containment* practices.

  - *Containment* – a method of backflow prevention which requires a backflow prevention device or method on the water service pipe in order to isolate the customer from the water main.

LSPC, Appendix D
Cross Connection Control

- **D104.1 Containment Practices.** Backflow prevention methods or devices shall be utilized to isolate specific water supply system customers from the water supply system's mains when such action is deemed necessary to protect the water supply system against potential contamination.

- **D104.2** As a minimum, the types of devices listed in Table D104 shall be installed and maintained by water supply system customers immediately downstream of the water meter.

LSPC-Table D104, Containment Practices

- **Table D104** – Lists various customer types and the particular Containment Device required for protection.
- NOTE: Table D104 is NOT inclusive of all potential contamination sources which may need containment protection.
- Who's Checking? Enforcement? Written up as Notice of Violation on Sanitary Survey for public water systems. If not corrected will go to an Administrative Order which has penalties in place for each day a system is not in compliance

Table D104[1]

Air Gap	
1.	Fire Protection/Sprinkler System utilizing non-potable water as an alternative or primary source of water
Reduced Pressure Principle Backflow Preventer	
1.	Hospitals, Out-Patient Surgical Facilities, Renal Dialysis Facilities, Veterinary Clinics
2.	Funeral Homes, Mortuaries
3.	Car Wash Systems
4.	Sewage Facilities
5.	Chemical or Petroleum Processing Plants
6.	Animal/Poultry Feedlots or Brooding Facilities
7.	Meat Processing Plants
8.	Metal Plating Plants
9.	Food Processing Plants, Beverage Processing Plants
10.	Fire Protection/Sprinkler Systems using antifreeze in such system
11.	Marinas/Docks
12.	Radiator Shops
13.	Commercial Pesticide/Herbicide Applicators
14.	Photo/X-ray/Film Processing Laboratories
Double Check Valve Assembly	
1.	Fire Protection/Sprinkler Systems
2.	Multiple Residential Dwelling Units served by a master meter.
3.	Multistoried Office/Commercial Buildings (over 3 floors)
4.	Jails, Prisons, and Other Places of Detention or Incarceration

Note:

1. Other Containment Practices - Table D104 is not inclusive of all potential contamination sources which may need containment protection. For potential contamination sources not listed in this table, backflow prevention methods or devices shall be utilized as directed by the Plumbing Official [or by the water supplier for those devices which may be associated with the water supplier's own water supply system located on public property or otherwise under the complete control of the water supplier (*e.g.*, water meter and the piping upstream of the water meter, if provided)].

Unlisted Cross-Connections

- If the cross connection or customer type is not specifically listed in Table D104 or Table D105, refer back to Section **606.2** of the LA State Plumbing Code.

- Section 606.2 – Approval of Devices
  - Devices for the prevention of backflow or back-siphoning shall comply with the standards listed in Table 606.

- In Table 606 you will see referenced, the "Manual for the Selection, Installation, Maintenance and Field Testing of Backflow Prevention Devices" published by the Canadian Standards Association.

Chapter 6 – Water Supply and Distribution

Table 606
Backflow Prevention Devices

MATERIALS	STANDARDS
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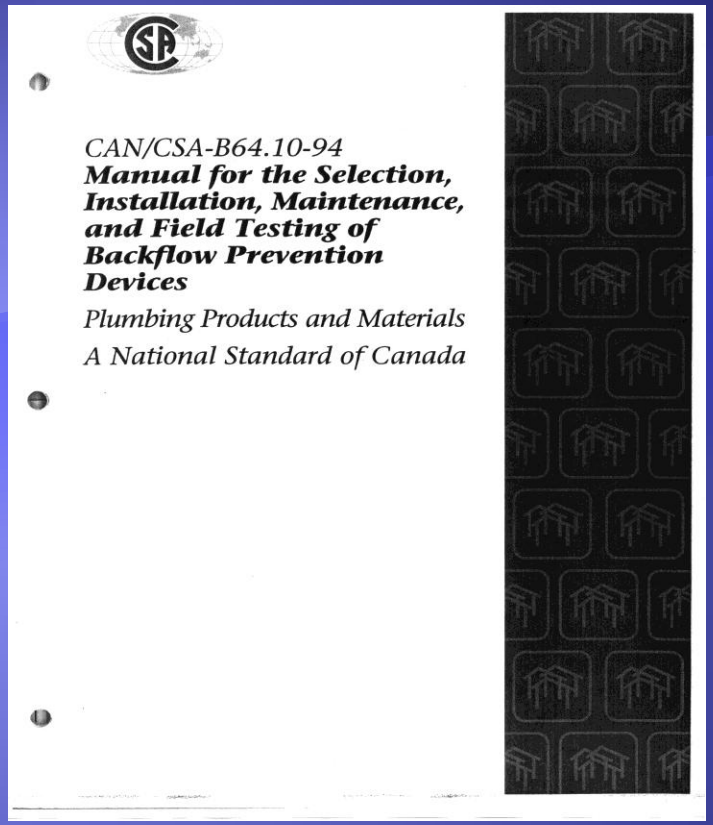
Backflow Preventers, Reduced Pressure Detector Assembly	ANSI/ASSE 1047
Backflow Preventers, Reduced Pressure Principle Assembly	ASSE 1013, ANSI/AWWA C511
Dual Check Valve Type Backflow Preventer	ASSE 1032, For carbonated beverage dispensers- post mix type
Field Test Procedures for Backflow Preventer Assemblies	ASSE 5010
Manual for the Selection, Installation, Maintenance and Field Testing of Backflow Prevention Devices	CAN/CSA-B64.10
Vacuum Breakers, Anti-Siphon, Pressure Type Assembly (Outdoor Use)	ASSE 1020
Vacuum Breakers-Atmospheric Pipe Applied	ANSI/ASSE 1001
Vacuum Breakers, Back Siphonage, Pressure Type Assembly (Spill Resistant)	ANSI/ASSE 1056
Vacuum Breakers, Hose Connection	ANSI/ASSE 1011
Vacuum Breakers, Laboratory Faucet	ANSI/ASSE 1035
Vacuum Breaker Wall Hydrants, Frost Resistant Automatic Draining	ASSE 1019
Water Closet Flush Tank Fill Valves (Ballcocks)	ASSE 1002

Louisiana State Plumbing Code, 2000 edition©



- Refer to Appendix B of the CAN/CSA-B64.10-94 Manual - "Guide to the Assessment of Hazard and Selection of Backflow Preventers for Individual, Area, and Premises Isolation". It is a 3 ½ page list of various cross connections and customer types with the recommended device(s) to address the hazard.

Additional Resources

- University of Southern California Foundation on Cross Connection Control and Hydraulic Research (USC FCCCHR)
  - Manual of Cross Connection Control, 10th Edition
    - Recommended Containment Protection
    - Includes Examples of Case History from 1903 to 1993.
- American Water Works Association (AWWA)
  - Recommended Practice for Backflow Prevention and Cross Connection Control
    - Recommended Containment Protection
- American Society of Sanitary Engineering (ASSE)
  - Guide to Cross Connection Protection Devices and Assemblies – Application and Selection of Devices

In Summary……

- The goal of protecting the public's health from water born illnesses does not stop when water leaves the treatment facility.
- All public water supply systems are required to have cross-connection control programs and should exercise careful surveillance of their systems.
- The dangers associated with cross connections can be greatly reduced by conducting regularly scheduled inspections of the distribution system to locate cross-connections, by eliminating cross connections when possible, and with the use of approved backflow prevention devices and assemblies.

ANY QUESTIONS ?

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Appendix

- How to purchase CAN/CSA-B64.10-94
  - Contact the Canadian Standards Association in Rexdale (Toronto), Ontario Tel. 1-800-463-6727 or (416) 747-4000
- How to obtain LA State Plumbing Code, 2000 edition
  - Copies can be purchased or viewed at:
    - http://www.iccsafe.org/Store/Pages/eCodes.aspx
  - Copies are also available to view at various libraries throughout the State. (you can contact Jeremy Harris at 225-342-7471 for a list of these libraries).